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THE PRESERVATION

—III—

GOOD EYE-SIGHT,

—AND THE—

*USE OF SPECTACLES,*

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OPHTHALMIC AND AURAL SURGEON TO ST. MARY'S HOSPITAL,  
AND SURGEON TO CINCINNATI EYE, EAR AND  
THROAT FREE DISPENSARY,

READ BEFORE THE

*OHIO STATE MEDICAL SOCIETY,*

JUNE 3D, 1879.

COLUMBUS, O.:  
COTT & HANN, BOOK PRINTERS.

B. 96

Compliments of

THE AUTHOR.

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## THE PRESERVATION OF GOOD EYE-SIGHT.

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I have hesitated to bring before this learned body, matters connected with the subject of this paper, many of which are so familiar to eye specialists, that it may seem an unnecessary labor to rehearse them. But I have been stimulated to do so by the expression of an interest in the subject by some of my medical friends, and also by the reflection that in the division of medical research, the busy practitioner has but little time to devote to a department which has for many years been handed over in a great measure to specialists.

With the desire to occupy as little of your valuable time as possible, I shall limit my paper to a brief review of the most practical and important facts connected with the subject.

A medical man who has had but little experience in the treatment of diseased eyes, would be naturally surprised, if he visited one of the large eye clinics of New York, at the great number of people who, so far as outward appearances go, have good vision but are really blind, or partially so, and it may seem to some that the statement, that a perfect eye is an exception, and that the majority of people, both young and old, have defective sight in one or both eyes, borders upon exaggeration. I believe the statement nevertheless to be true. The question naturally arises as to the cause of so large a number of imperfect eyes, and whether there is an adequate remedy for so great an evil. The first proposition may be explained by the statement of a fact well known to oculists, that a very large proportion of mankind have eyes that are more or less defective in shape, to which fact is to be attributed the large amount of errors of refraction, necessitating, even in the young, the use of glasses. The second proposition involves, first, the question of heredity and marriage, and secondly, an investigation into the proportion of congenital and acquired defects.

The evidences of the important influence of heredity in transmitting the physical infirmities of parents to their children, are too numerous and too familiar to us all to require an elaboration of the argument. Within my observation have come many families in which the parents, one or both, and several children have either far or near sight; confirming to my mind the correctness of the opinion of eminent oculists, that the larger proportion of those errors of refraction are congenital. It therefore becomes an important factor in the selection of a life companion. That this question does not acquire the importance which it should, is in some measure due to the neglect of parents and public educators to bring it before the young. In fact, the mere allusion to such a subject by a teacher to a class of scholars, would, in the present condition of society, be regarded by many as indelicate and calculated to excite discussions, demoralizing rather than elevating to the minds of the young of both sexes. When so little attention is given to grave physical infirmities in the selection of husband and wife, it may naturally appear to a great many persons that the subject is carried to the verge of absurdity, when the refractive condition of a young person's eyes should be considered a reasonable bar to the union of a couple otherwise well suited to each other. Although I am fully aware that any one who should advocate the propriety of such a selection, would place himself as a target for innumerable shafts of harmless ridicule, nevertheless, I am decidedly of the opinion that two young people, both subjects of myopia, or hypermetropia, of *high degree*, commit an error but little short of a crime in inflicting upon their probable offspring the calamity of partial or defective vision. Hypermetropia is generally attributed to an arrest in the development of the globe, by which its symmetry, as a perfect dioptric apparatus, is destroyed. Imperfect or faulty nutrition may have an important influence in producing this condition, but the number of hypermetropes who have not, so far as their hygienic surroundings could indicate, been subjected to malnutrition, point strongly to an hereditary transmission of the affection. We have not the data to state with accuracy how far the asymmetry of the eye can be carried in this direction, by the marriage of hypermetropes, but it is safe to assume from analogy that the malformation would increase pro-

gressively from this cause. In myopia, we have not so much an arrest of development as an overdevelopment in one direction. The hypermetropic eye is not only a flat eye, i. e. too short in its antero-posterior diameter, but frequently also is small in comparison with the normal, as well as with the myopic eye. Myopes, on the contrary, may often be detected by the prominent and rather large appearance of the eyeballs. I have, however, met with several exceptions to this rule, in which, owing probably to an excessive amount of adipose tissue back of the globe, the eyes of the individual were particularly prominent and apparently more than normally elongated in the antero-posterior diameter, but upon examination I found them really to be hypermetropic.

In opposition to the now well established hereditary predisposition, as a cause of hypermetropia, I may state that Von Jager, one of the oldest and most eminent of European oculists, found by ophthalmoscopic examination, "that the eyes of most newly born children are, on paralysis of accommodation, moderately myopic, but soon, on further development, these lose myopia, and in the first years of life mostly become emmetropic. The great difference in the form of the eyes does not occur until a later period."\* There were, however, some exceptions, about five per cent. having normal refraction, and seventeen per cent. having hypermetropic eyes. Donders says that in the fifth and sixth, and sometimes in the fourth year, he has demonstrated considerable degrees of hypermetropia, and has not observed these to disappear at a later period.

The evidence of hereditary transmission of myopia, is even greater than that of hypermetropia, the number of cases of near sight, in the same family where one or both parents are also myopic, being of so common occurrence as to be familiar to us all. This condition is also more easily and more frequently acquired than far sight. The social condition has also an important influence upon the development of myopia, the wealthy and cultivated being much more frequently the subjects of it, than the poor and illiterate. People who live in cities are also more liable to myopia, and country people to hypermetropia. As in other cases, there are many exceptions to the rule.

In some families who live in the country, myopia pre-

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\*Donders upon Refraction and Accommodation.

dominates, and the eyes of some sailors, who have been accustomed to training the eyes upon distance, have been found to be slightly near-sighted. In what proportion these errors of refraction exist, independent of congenital malformation, it is difficult to determine.

We must, in the consideration of hypermetropia, exclude those cases of far sight which are the result of senile changes in the crystalline lens, called presbyopia, since the latter condition may be associated in the same eye with either myopia or hypermetropia.

The investigation of Dr. Cohn, in Silesia, upon the eyes of school children, led him to the conclusion that improperly constructed desks, and imperfect light, were the chief causes of the defective sight among the ten thousand under examination. The low desks, so commonly found in our schools, are undoubtedly injurious to the eyes of children, as they favor a stooping position, an unfortunate habit to which the young are especially liable, a position which favors congestion of the coats of the eye-balls, sometimes inducing myopia and always greatly aggravating and increasing the disease in congenital cases. More care is necessary in arranging children at desks suitable to their respective ages, and they should always be placed at desks sufficiently high to keep the body erect.

A proper regulation of the light is also an important means of preserving the eyesight. In the construction of school-houses, particularly throughout the country and in small towns, too little attention is paid to the arrangement of the windows, with reference to light. When there is no obstacle on account of space and surrounding buildings, the windows should face the north and south, so that the children may not be subjected to the strong rays of the sunlight, shining directly into their eyes, or reflected from the printed page. The desks should be so arranged as to place the children with their backs to the light, and in the proper arrangement of blinds and shutters, to modify its intensity. Sunlight, reflected from the book into the eyes of school children, may, in a short time, impair, by over-stimulation, the sensitive function of the retina, thereby laying the foundation for serious, and often incurable, disease. In large cities, a portion of the pupils are, owing to their situation, often compelled to study in a dim light, thus causing a strain upon the accommodation of the eyes, in-



ducing congestion of some of the coats of the ball. In brief, the evils enumerated may cause congenital far and near sight to become progressive, and undoubtedly induce myopia in eyes that might otherwise have remained in a healthy condition.

It is now well understood by oculists that the majority of cases of so-called weak eyes among children, are the result either of myopia, or hypermetropia. The relief of the former was more readily understood, and suitable concave glasses were recommended by the physicians, but even among eye specialists, many cases of weak eyes, called asthenopia, the result of a slight flatness of the eye-ball, were thought to be the result of enfeebled powers of accommodation. This notion was the more readily entertained, since such cases often occur in feeble and delicate children, and as the sequence of exhausting fevers or sickness, producing a weakness of all the muscles of the eye-ball, and sometimes paresis of the ciliary muscles, which control accommodation. The causes just enumerated are, in fact, one source of asthenopia, since the affection is always associated with either a want of energy or fatigue of the accommodative muscle, and is accompanied by a tired and aching sensation upon comparatively light use of the eyes in reading or other fine work. The more common cause of this muscular exhaustion was not understood by the older authors upon ophthalmology, until Prof. Donders, in 1858, proved it to be due to a slight degree of hypermetropia, and that it could be relieved by suitable convex glasses.

*Hypermetropia and Myopia, a cause of Squint:*—Although it has been many years since the cause of squint has been found to be due to far and near sight, and that it is often associated with, or a sequence of, muscular asthenopia, I am persuaded, from my conversation with medical men, that the importance of that fact, in a therapeutical point of view, is not appreciated or fully understood by the majority of general practitioners, and I trust the eye specialists present will bear with me if, in order to refresh your memories upon this subject, I find it necessary to reassert facts which are no longer *new* to them.

The popular opinion, even among medical men a few years back, was that squint was generally the result of imitation, or due to a foolish play among children; that this

belief is also in some measure founded upon fact has been proved by the investigations of Dr. Cohn, and other specialists. Dr. Cohn, in his examination of several thousand school children, found forty-five cases of squint the cause of which he could not assign to far or near sight, or other complications, but which he finally traced to a play among the children, which consisted in holding the forefinger in front of the eyes and bringing it up to within two inches of the nose, then, removing the finger, they would strive to see which could longest keep the eyes turned in. A spasmodic contraction of the internal rectus muscle would sometimes terminate in a permanent contraction, producing convergent squint.

It is now well understood, however, that the majority of cases of convergent and divergent strabismus, are caused by hypermetropia and myopia, but the important fact that strabismus *may be prevented and sometimes relieved by the use of suitable glasses*, at an early period of its manifestation, should be more generally appreciated and understood by the public.

The opposition to the use of spectacles by the young, which, until within a few years, prevailed among medical men as well as the public, had its origin in a great degree in the teachings of the older authors upon ophthalmology. The progress made in the latter science in recent years has exploded the old dogma, founded upon incorrect hypotheses, and while in some localities fashion may produce occasional error in the other extreme, i. e., of wearing glasses where none are needed, it can not be controverted that thousands of eyes are annually by their employment saved to useful vision which formerly would have been sacrificed to ignorance and prejudice.

The notion still prevails, however, to a great extent, that the vendors of spectacles are competent judges of the necessity for their employment, and for the selection of the proper glass required for any case presented to them. Even medical men will pick up, at the jewelry store, or purchase from the traveling pedler, spectacles without the proper test, or even reflection upon the subject, the only criterion being that, for the time, they see better than they did without them, or with the old pair. But as the knowledge of the necessity of a proper examination of every eye before it is fitted with a glass, and the fact that such

examination requires both the skill of the optician and some acquaintance with the laws of optics, as well as the practical information of the physician, becomes more generally diffused, the trade in spectacles in illegitimate channels is rapidly falling off, and I trust, for the good of humanity and the preservation of good eye-sight, will soon be discontinued, and remembered only as a tradition to be classed in literature with that period in the progress of science that the stage coach occupies in mechanics.

*How soon shall we begin to wear spectacles, and how frequently shall they be changed:*—Prof. Donders says the opinion is rather general that we should refrain as long as possible from the use of convex glasses. But is it not folly to weary the eyes and the mind together, without any necessity, condemning ourselves to guess with much trouble, at the forms which we could see pretty well with glasses? He lays down the law, that, “*so soon as by diminution of accommodation, in ordinary work, the required accuracy of vision begins to fail, there is need of convex glasses. The test is, with weak glasses of 1-80 to 1-40, at the same distance as without glasses, the accuracy of vision is manifestly improved.*” Between forty-five and fifty years of age, the normal eye begins to feel uncomfortable if taxed with much fine work or night reading, and this is the first indication of the necessity of glasses. Those individuals who have been enabled to go over fifty years of age without the use of glasses, are either slightly near-sighted, or they abstain from night work, and as a rule avoid fine print. Where glasses are needed before the fortieth year, hypermetropia, or some anomaly of refraction, or other complication, will be found to exist, although it may be so slight as not to have given trouble until near the time when persons ordinarily expect to wear glasses.

The necessity for a change of glasses depends so much upon the anomaly of refraction, or other trouble, for which they have been given, that no precise rule can be prescribed.

*In the case of convex glasses, it will be safe to change them when they are found to be no longer comfortable, or do not afford as perfect vision, at the same distance, as when they were first worn.*

*Protecting spectacles*, are of many varieties, suited to the fancy of the individual or the character of his work. For

the purpose of protecting the eyes from dust or small particles of metal, plain colorless glasses should be worn. They should, however, be sufficiently large to serve the purpose for which they are intended, and not, as is often the case, so small as to be merely ornamental.

*Colored glasses*, worn for the protection of weak or sore eyes, from strong light, should be selected with care. Green glasses were at one time worn, because it was supposed that as the green grass and the green foliage of trees are so pleasant to the eye, particularly in the early spring, that color must necessarily be soothing to the eyes. This, however, is not found to be the case. While reflected rays of light from the green foliage of spring are agreeable, the green rays transmitted through dark green glasses are found to be irritating, rather than beneficial, to sensitive eyes.

“*Blue glasses*:”—The novel theory upon the subject of the influence of blue light as an agent for the cure of disease, promulgated by General Pleasanton, some three years ago, excited, for a time, a great sensation in the fashionable world. But, as we predicted at the time, it soon ran its race, and died a natural death. Light, as is well understood, exercises an important physiological influence upon animals, as well as plants. It has been ascertained, also, that the blue and red rays exercise, to a limited extent, a beneficial influence, in certain conditions of the nervous system, and it is certainly true that light transmitted through blue glass is far more agreeable to a sensitive retina than through green. Blue glass spectacles are, therefore, preferable to green, but even they should not be worn without the advice of a competent physician, or oculist, since they are liable to render the healthy eye unnaturally sensitive to strong light. In the majority of cases, the London smoked glasses are better suited to weak or sore eyes, than either green or blue, since they do not change the light, but simply soften all its rays. Protecting glasses should not be worn within doors, or upon dark days, except in severe cases of photophobia, as by the increased dimness of the light which they produce, they increase the strain upon the accommodation.



